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10/827,148

04/19/2004

James F. Stevens

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01/06/2009

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EXAMINER

MERKLING, MATTHEW J

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

01/06/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/827,148

Applicant(s)

STEVENS, JAMES F.

Examiner

MATTHEW J. MERKLING

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 4, 8-10 and 18-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-7 and 11-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/11/08 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. (US 2005/0112056) in view of Edlund et al. (US 2002/0114984).

Regarding claim 1, Hampden-Smith discloses a fuel supply apparatus for providing a hydrogen-rich reformat, the fuel supply apparatus comprising:

a reforming reactor (single-step reformer, paragraph [0251]) comprising a catalyst bed for converting a hydrocarbon fuel to a reformat (see abstract), the catalyst bed comprising a reforming catalyst and a carbon dioxide fixing material (paragraph [0209]);

a hydrogen storage device (paragraph [0252]) in fluid communication with the reforming reactor for storing a portion of the reformat;

a reformat outlet (hydrogen product) in fluid communication with the hydrogen storage device (paragraph [0252]).

While Hampden-Smith discloses utilizing the reforming reactor in conjunction with a hydrogen storage device which provides hydrogen fuel to a fuel cell (paragraph [0252]), Hampden-Smith does not explicitly disclose a controller in communication with the reforming reactor and the hydrogen storage device for controlling the delivery of reformat to the reformat outlet.

Edlund also discloses a reforming reactor (fuel processor, 12) in communication with a hydrogen storage device (60) which provides hydrogen to a fuel cell (78). Edlund teaches a controller (120) that controls a valve (106) that supplies the reformat (56) to the hydrogen storage device (60) as a preferable way of regulating flow to the hydrogen storage device and the fuel cell (paragraph [0045]).

It would have been obvious to one of ordinary skill in the art to add a controller, as in Edlund, to the communication means from the reforming reactor to the hydrogen storage

device of Hampden-Smith as a preferable way of regulating the flow of reformat to the hydrogen storage device and the fuel cell.

5. Claims 1-3, 5-7 and 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sircar et al. (US 6,103,143) in view of Edlund et al. (US 2002/0114984).

Regarding claims 1, 7, 11 and 12, Sircar discloses a fuel supply apparatus for providing a supply of hydrogen-rich reformat, the fuel supply apparatus comprising: a reforming reactor (10) comprising a catalyst bed (26, 27) for converting a hydrocarbon fuel to a reformat (see abstract), the catalyst bed comprising a reforming catalyst (26) and a carbon dioxide fixing material (adsorbent, 27);

While Sircar discloses a fuel processing apparatus designed to produce hydrogen rich product which can be used in a fuel cell (col. 1 lines 58-64), and which requires regeneration (see abstract), Sircar fails to explicitly disclose the placement of the preferential fuel processing apparatus in a fuel cell and fuel processing system with a compressor and high pressure storage device. Sircar also fails to disclose a controller that controls the operation of the hydrogen storage device and the flow rate of reformat to the hydrogen storage device.

Edlund also discloses a fuel processing apparatus (12) designed to produce hydrogen rich product for a fuel cell (78). Edlund teaches a fuel processing system comprising: a hydrogen storage device (high pressure cylinder, 60, paragraph [0036])) in fluid communication (see Fig. 6) with a compressor (62) and a reforming reactor/fuel processor (12) for storing a portion of the reformat (paragraph [0034] and [0036]);

a reformat outlet (56) in fluid communication with the hydrogen storage device (see Fig. 6); and

a controller (120) in communication with the reforming reactor and the hydrogen storage device for controlling the delivery of reformat to the reformat outlet (paragraph [0045]), said controller also controlling the hydrogen storage device and the delivery of reformat to the hydrogen storage device (paragraph [0045])

Edlund teaches this system as a preferable way of utilizing hydrogen from a reforming reactor/fuel processor (12) in a way to power a fuel cell and maintain storage capacity of hydrogen in the event of temporarily losing the function of the reforming reactor (see abstract and paragraph [0068]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the fuel processing system of Edlund as described above to the reforming reactor of Sircar as a preferable way of providing continuous reformat flow to a fuel cell while maintain function of said fuel cell when the reforming reactor of Sircar is not functional (such as during regeneration).

Regarding claim 2, Sircar, as discussed in claim 1 above, further discloses a single reaction bed (see Fig. 1).

Regarding claim 3, Sircar, as discussed in claim 1 above, further discloses a water gas shift reaction taking place in said catalyst bed (col. 17 lines 6-28).

Regarding claim 5, Sircar, as discussed in claim 1 above, further discloses a heat generating means connected to the reactor (col. 4 lines 44-47).

Regarding claim 6, Sircar, as discussed in claim 1 above, further discloses a pressure swing adsorber (PSA) for purifying said reformat (col. 15 lines 22-30).

Regarding claims 13-15, Sircar, as discussed in claim 1 above, further discloses the reforming reactor is operable in a non-reforming mode (such as regeneration, see abstract). Furthermore, regarding limitations recited in claims 13-15 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP §2114 and 2115. Further, process limitations do not have a patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.

Regarding claim 16, Sircar, as discussed in claim 1 above, further discloses a hydrogen-consuming device (fuel cell) downstream of said reforming reactor and utilizing said reformat (col. 1 lines 58-64).

Regarding claim 17, Sircar, as modified by Edlund in claim 16 above, further discloses that said controller communicates with said hydrogen-consuming device (fuel cell, paragraph [0048] of Edlund).

Response to Arguments

6. Applicant's arguments filed 11/11/08 have been fully considered but they are not persuasive.

7. On page 8, Applicant argues that Hampden-Smith does not disclose a fuel supply apparatus comprising a reforming reactor and a hydrogen storage device, and does not disclose a hydrogen storage device in fluid communication with the reforming reactor for storing a portion of the reformat. The examiner respectfully disagrees with this argument. Hampden-Smith clearly discloses these elements, and are set forth in paragraph 252. Hampden clearly discloses a reformer (SSR, single step reformer) which is fluidly coupled to a hydrogen storage device (hydride storage material).

8. On pages 9 and 10, Applicant argues that Edlund does not disclose a controller in communication with the reforming reactor. The examiner respectfully disagrees with this argument. It is the examiner's position that the term "in communication" is a very broad term which encompasses any sort of communication between the reforming apparatus and the controller. As stated in the office action, the pressure transducer 116, which is downstream of the reforming reactor, will indicate the operating pressure of the reforming apparatus. Furthermore, Edlund also discloses that the controller includes a user interface which monitors process variables of the system including the fuel processor. Placing a controller in communication with the fuel processor, as well as in control with the hydrogen storage device, will give operators more information about and better control of the fuel processing system (see paragraphs 51 and 56 of Edlund).

Conclusion

9. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795